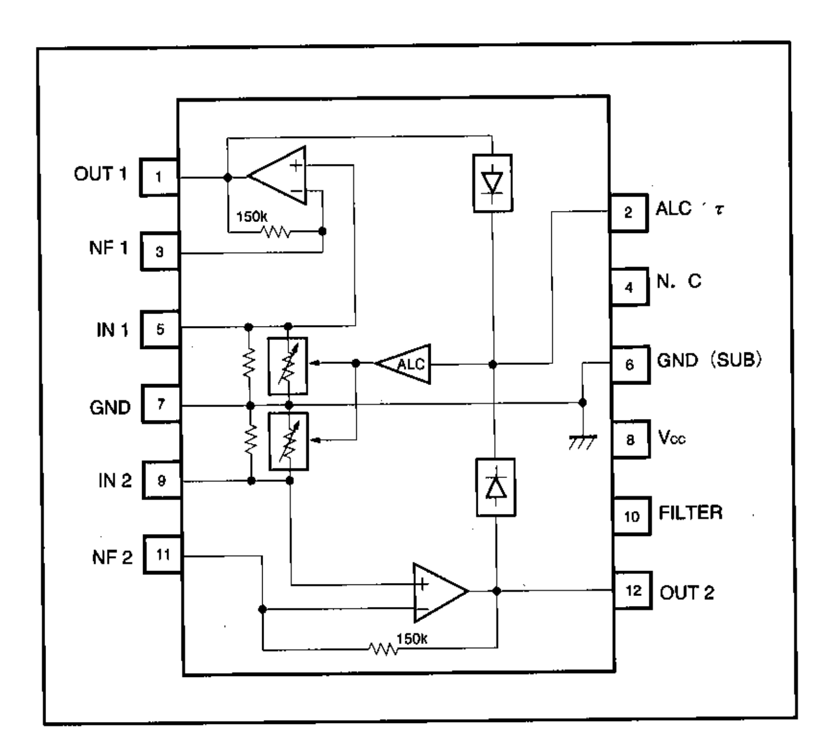
Dual preamplifier with ALC detector circuit
BA3313L

The BA3313L is dual preamplifier ICs with built-in ALC detector circuit, designed for use in stereo radio cassette recorders. It comes in a compact 12-pin ZIP package, and has two record/playback preamplifiers, and an ALC detector circuit. The preamplifiers can be directly coupled to the tape head without coupling capacitors to prevent tape head magnetization and "pop" noise generation.
With the built-in ALC detector circuit, an ALC circuit with large dynamic range can be constructed with addition of just an external time constant circuit.

●Applications
Stereo radio cassette recorders

●Features
1) Input bias circuit does not require coupling capacitors.
2) Built-in ALC circuit with external time constant circuit.
3) Wide operating supply voltage range.
4) High gain.
5) Low noise.

●Block diagram



●Absolute maximum ratings (Ta = 25℃)

Parameter	Symbol	Limits	Unit
Supply voltage	Vcc	14	V
Power dissipation	Pd	400*	mW
Operating temperature	Topr	−25~75	℃
Storage temperature	Tstg	−55~125	℃

* Reduced by 4.0mW for each increase in Ta of 1°C over 25°C

●Recommended operating conditions (Ta = 25℃)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	Vcc	5.0	8.0	12.0	V

●Electrical characteristics (unless otherwise specified Ta = 25℃, V_{CC} = 8V and f= 1kHz)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Quiescent circuit current	I_Q	1.5	3.0	6.0	mA	
Open-circuit voltage gain	G_{VO}	70	85	—	dB	V_O=1Vrms
Closed-circuit voltage gain	G_{VC}	49	52	55	dB	V_O=0.3Vrms
Total harmonic distortion	THD 1	—	0.3	1.0	%	V_O=0.3Vrms
Maximum output voltage	V_{OM}	1.5	2.0	—	Vrms	THD=1%
Input conversion-noise voltage	V_{NIN}	—	1.0	1.8	μVrms	Rg=2.2kΩ,DIN AUDIO 45dB at 1kHz NAB
Input resistance	R_{IN}	35	51	71	kΩ	
Channel separation	CS	40	55	—	dB	Rg=2.2kΩ
ALC range *	ALC	40	53	—	dB	
ALC balance	ALB	—	0	3.0	dB	V_{IN}=−45dBV
ALC distortion	THD 2	—	0.3	1.0	%	V_{IN}=−45dBV
ALC output voltage	V_{ALC}	700	850	1000	mVrms	V_{IN}=−45dBV

* The range for which the ALC begins to operate is the output voltage + 3dB with respect to the output voltage.

● Measurement circuit

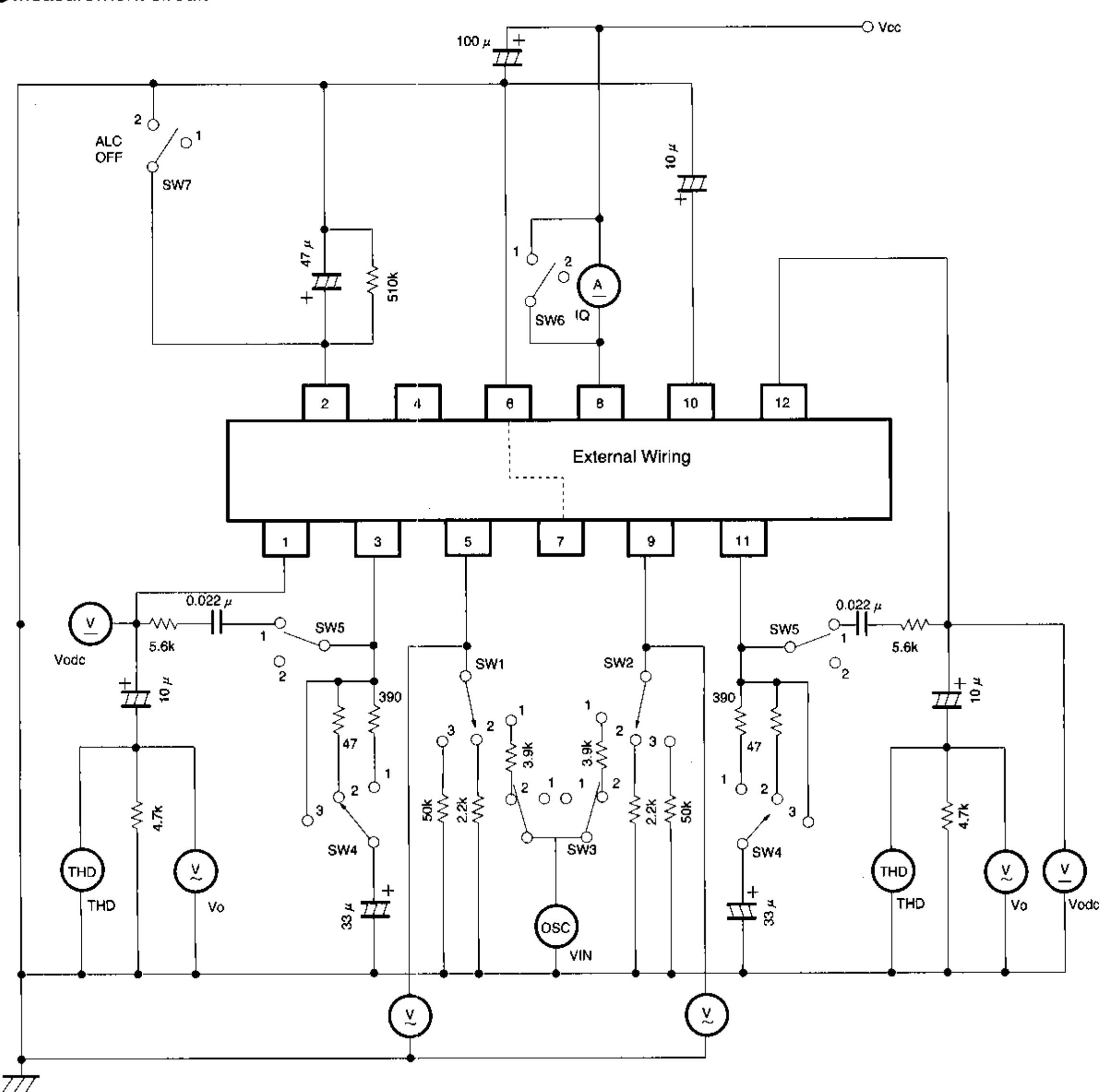


Fig. 1

Units

Resistance	: Ω (±1%)
Film capacitors	: F (±1%)
Electrolytic capacitors	: F (±5%)

●Application example

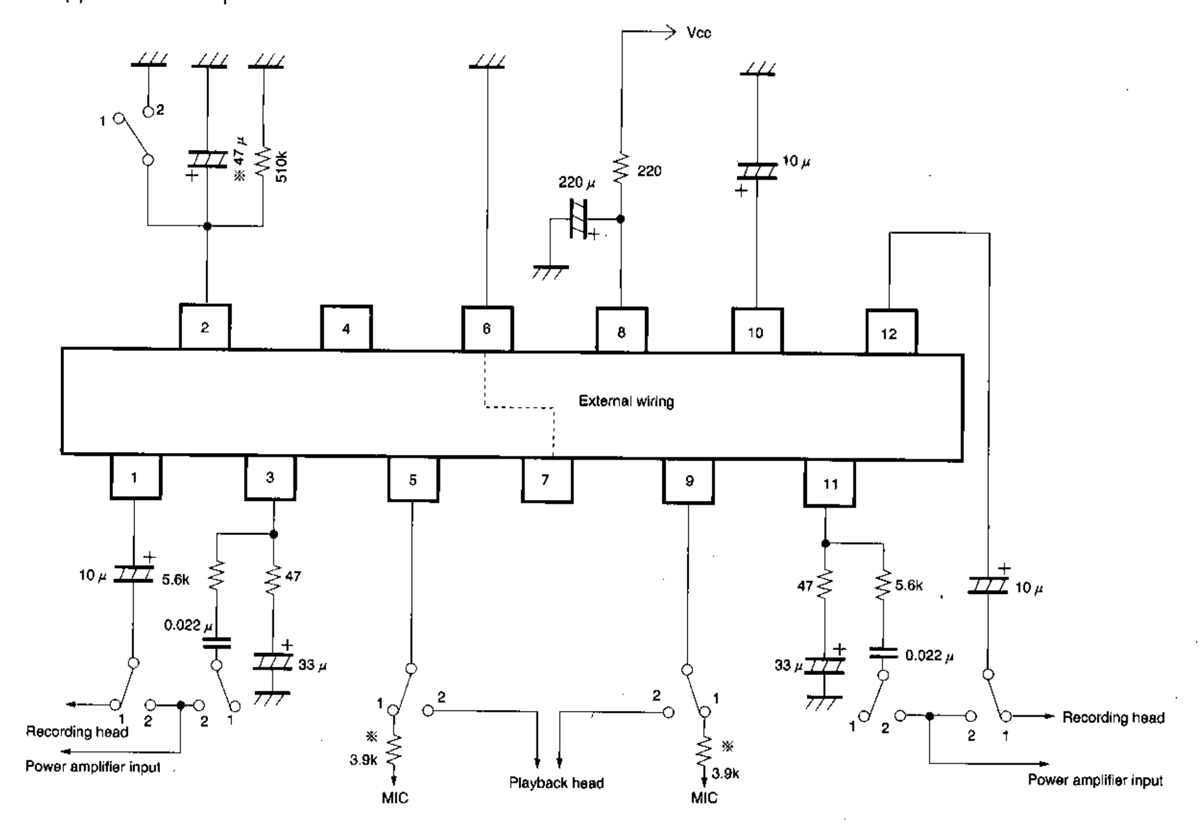


Fig. 2

SW
1: Recording
2: Playback

Unit

Resistance	: Ω (±5%)
Film capacitors	: F (±10%)
Electrolytic capacitors	: F (±20%)

●Operation notes (the resistor marked with an asterisk)

Changing the input resistor Rg, and the ALC time constant influences the ALC transient characteristics. In particular, if Rg is less than 3.9kΩ or the time constant capacitor is less than 47 µF, the ALC may operate excessively. Do not use smaller values than those recommended for these components.

●Electrical characteristics curves

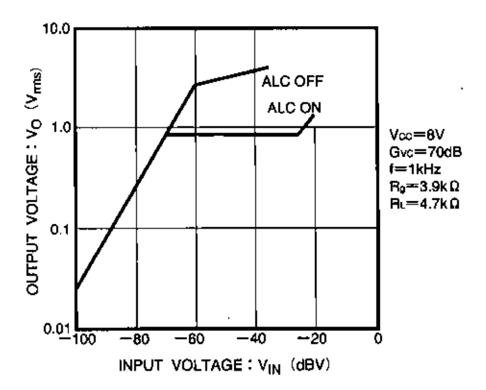
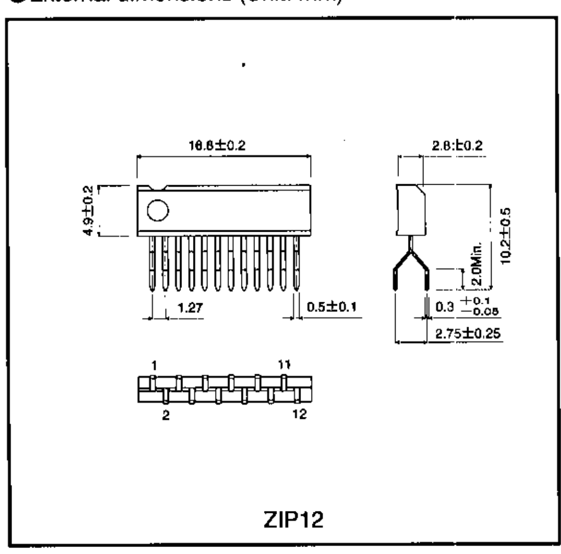


Fig. 3 Input voltage vs. output voltage

●External dimensions (Unit: mm)



ZIP12